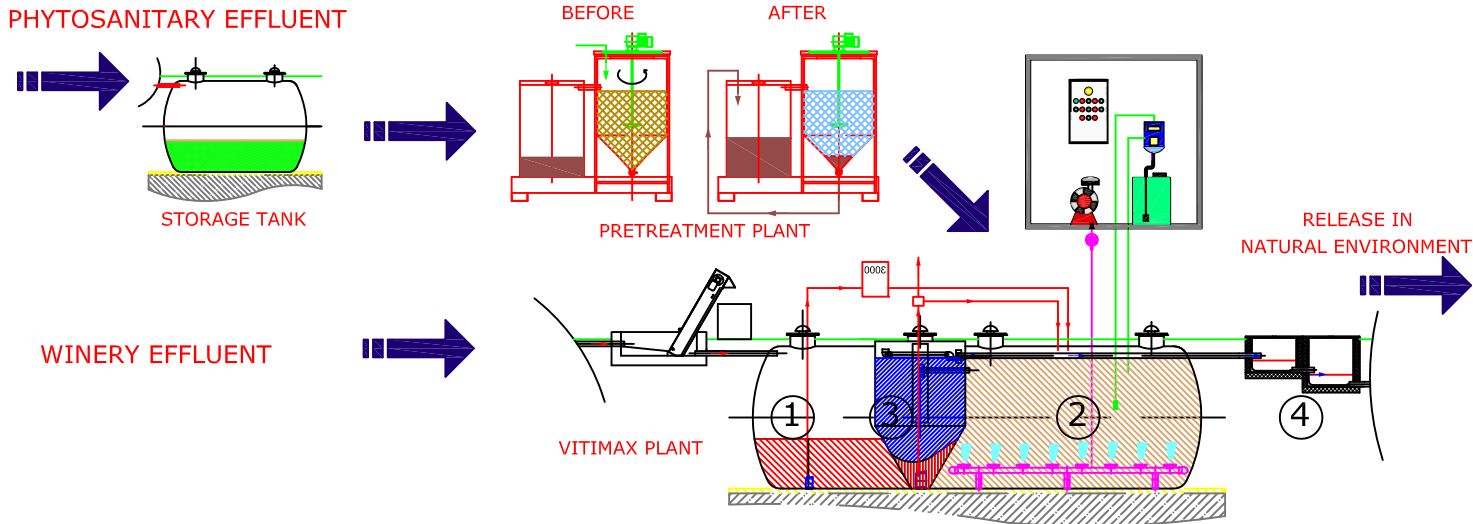


# Vitimax® : Treatment system for Winery and phytosanitary effluents

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## I. PRESENTATION

AGRO-ENVIRONNEMENT has, since 2001, taken part in the experimental system set up by the French Ministry of Agriculture and Ecology on treatment of phytosanitary effluent. Wineries have the special circumstances of having to manage two types of effluent in each operation:

- winery effluent, from wine-making in the store and washing down harvesting machinery (pollution of organic origin)
- Phytosanitary effluent including all liquid waste polluted by phytosanitary products (chemical pollution)

**The principle of the system is to treat the two sorts of effluent in the same plant using activated sediment micro-fauna in the pollution control Vitimax® plant.**

## II. PRETREATMENT OF PHYTOSANITARY EFFLUENT

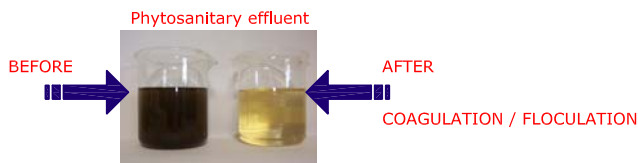
### Aim :

To keep solids and the non-soluble part of mineral elements used in the treatment in suspension, for example, copper, sulphur, and aluminium so that they don't build up in the treatment plant sediment.

### Principe :

- First Coagulation phase: Consists of growing the colloidal particles responsible for the turbidity and discolouration of the water sufficiently to be separated.
- Second Flocculation phase: Enables micro-flakes that have formed to be grown which will then be capable of more rapid decantation.
- Third Decantation phase: The resultant sediments from this operation, (less than 2% of the total volume of pre-treated effluent) are considered as being Hazardous Waste, for treatment in an authorised incineration centre.

Photo of a stage in the coagulation/flocculation process carried out in the laboratory



Calculation of copper retention in tests under laboratory conditions

Type of effluent	[Cu] in mg/l Before pre-treatment	[Cu] in mg/l after pre-treatment	% of copper retention
Effluent 1 (slurry)	2 510	9,9	99,6 %
Effluent 2 (phytosanitary effluent)	9,1	< 0,010	At least 99,9%

### Operation:

- in the storage tank when all of the phytosanitary effluent can be collected.
- using an automatic pre-treatment plant which pre-treats steadily with the production of phytosanitary effluent.

## III. WINERY EFFLUENT TREATMENT PLANT - WORKING PRINCIPLES

- **The Storage phase (1)** : Allows the treatment phase to be gradually fed at a regular rate of flow thus suppressing the noxious effects of peaks of pollution linked to large winery effluent volumes over a short period.
- **The Treatment Phase (2)** : Enables the breaking down of winery effluent by free or fixed culture bacteria in an aerobic medium. Oxygen is provided by a system of fine aeration bubbles or by hydro-ejectors.
- **The Decantation Phase (3)** : Separates the cleansed effluent and sediments in suspension resulting from the treatment. These sediments are extracted from the bottom of the decanter by an immersed pump in order that they might be re-injected at the top of the plant.
- **The filtration phase (4)** : by gravel filter or reed-bed filter

## IV. ADAPTATION OF THE PLANT TO TREAT PHYTOSANITARY EFFLUENT

- The volume of phytosanitary effluent that can be treated = 40% of the total of activated sediments in the plant.
- Directly introduced into the treatment chamber outside of busy winery periods so as not to dilute the two effluent types.
- Operating in a closed circuit at the end of this series gives, for 20 days without other supply of winery effluent.
- No changes made to the operation of the plant.

## Results obtained in treated liquids and sediments from Vitimax®

The breaking down of active substances and their metabolite break-down > 81%  
 Physical Chemical parameters : Ave..COD (Chemical Oxygen Demand):68 mg/l,  
 ave DBO5 = 1,8 mg/l, SS (Suspended solids) = 32,5 mg/l

Eco-toxicological tests of treated effluent:

- Daphnia Test CE50i 24 hr: >90% no toxic effect
- Algae Test CE50 72 hrs: 62% of very weak toxic effect

Eco-toxicological Sediment Tests:

- Daphnia Test CE50i 24 hr : > 90 % no toxic effect
- Acute toxicity Test on Earthworms : > 30 % no toxic effect
- Earthworm Reproduction inhibition test : Absence of mortality, absence of effect on the numbers of larvae produced, absence of effect on reproduction
- Effect on germination and growth of monocotyledons : Absence of inhibition
- Effect on germination and growth of dicotyledons : Absence of inhibition